Letter to the Editor

New Equations for Predicting Postoperative Risk in Patients with Hip Fracture

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To the Editor:

We read with interest the recent article “New Equations for Predicting Postoperative Risk in Patients with Hip Fracture” by Hirose et al. [4] and their previous relevant reports [5, 6]. In their series of studies, they reportedly validated the effectiveness of the Estimation of Physiologic Ability and Surgical Stress (E-PASS) scoring system to predict postoperative risk in patients with hip fracture based on significant correlations between E-PASS scores and hospitalization outcomes.

However, we consider the correlation coefficients in their studies [4–6] low (the majority of which were less than 0.2). The degree of the correlation of two variables is determined by the absolute value of either Pearson’s correlation coefficient r or ranked Spearman correlation coefficient ρ . Commonly, $|r| > 0.7$ or $|\rho| > 0.7$ indicates a strong correlation, $|r|$ or $|\rho|$ between 0.3 and 0.7 indicates a moderate correlation, and $|r| < 0.3$ or $|\rho| < 0.3$ indicates a weak correlation [2]. Thus, although statistically

significant, most correlations in their studies were weak. We wonder if one variable can be effective for predicting the other when they are weakly related.

In addition, the square of Pearson’s correlation coefficient (r^2) may provide an easier interpretation, which represents the proportion of the variation of one variable “explained” by the other [2]; for example, the strongest correlation in one [5] of the articles: surgical stress score (SSS) and costs of postoperative hospitalization ($r = 0.44$), which correlated significantly ($p < 0.0001$). However, only approximately 19% ($r^2 = 0.44 \times 0.44$) of the variation of costs can be “explained” by SSS. Considering the even smaller parts of variation of costs “explained” by preoperative risk score and comprehensive risk score ($1.4\% = 0.12 \times 0.12\%$, $5.3\% = 0.23 \times 0.23\%$, respectively), the conclusion that E-PASS was useful for estimating costs should be interpreted with caution.

The E-PASS scoring system originally was established to predict adverse postoperative effects in patients undergoing elective gastrointestinal surgery [3]. Although it has been verified to be effective in other types of surgery, such as elective repair of abdominal aortic aneurysms [7] and thoracic surgery [8], it was a poor predictor of complications in patients requiring liver resection [1], and the authors recommended a new modified logistic regression to better predict the postoperative outcome. Therefore, the E-PASS scoring system is not applicable to every surgery without adjustment. Because the majority of the correlations between each E-PASS score and hospitalization outcomes were weak in the serial studies of Hirose et al., we suggest this system may not be a useful predictor for patients with hip fractures, and the E-PASS system might need to be modified for better evaluation.

(Re: Hirose J, Ide J, Irie H, Kikukawa K, Mizuta H. New equations for predicting postoperative risk in patients with hip fracture. *Clin Orthop Relat Res*. 2009;467:3327–3333.)

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